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EXAMINER

THOMAS, MIA M

ART UNIT

PAPER NUMBER

2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/521,779	<b>Applicant(s)</b> KOMIYA ET AL.	
	<b>Examiner</b> Mia M. Thomas	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 17-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 17-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>see attached (12 total)</u> .                                 | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is responsive to applicant's remarks received on 17 March 2008. Claims 1, 17-35 are currently pending. Claim 1 has been amended. Claims 2-16 are canceled. Claims 17-35 are new. No new matter has been added. The amendments to the specification are approved and entered herewith this instant application.

### **Claim Suggestions**

2. With regards to the applicant's claim of priority of Japanese application 2002-218864, although the claim of priority was properly claimed in the Declaration filed with the original application, the Applicant is encouraged to claim the benefits of the foreign filing date in the specification.

### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### **Claim Rejections - 35 USC § 103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1, 17-23, 25-28, 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elbaum et al. (US 6,201,880 B1) in combination with Gill et al. (WO 02/012847 A1).

**Regarding Claim 1:** (Currently Amended) Elbaum discloses an image processing system (Refer to Figure 1, numeral 10) comprising:

an image capturing unit (Refer to Figure 1, numeral 24);

and an image processing unit (Refer to Figure 1, numeral 26),

the image capturing unit comprising:

an image pick-up optical system which picks-up an image of a subject (Refer to Figure 1, numeral 12; "The system 10 includes a source of illumination 11 which provides light to a hand piece 12 via an optical fiber or optical fiber bundle 14." at column 5, line 57);

an image pick-up device unit which obtains a subject signal from the subject (Refer to Figure 1, numeral 20);

and a photographing operating unit which performs an image photographing operation, the image capturing unit interlocking the plurality of illuminating light sources with an exposure timing of the image pick-up device unit (Refer to Figure 1, numeral 11),

selectively lighting-on the plurality of illuminating light sources, and thus obtaining a plurality of subject spectroscopic images, and the image processing unit comprising: an image memory unit

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which stores the subject spectroscopic images photographed by the image pick-up unit (Refer to Figure 1, numeral 26a);

selectively lighting-on the plurality of illuminating light sources, and thus obtaining a plurality of subject spectroscopic images, and the image processing unit calculates a desired image based on the image signal stored in the image memory unit ("In addition to providing graphic displays that aid in visualization, the preferred embodiment of the present invention permits the operator to display on the monitor 28 one or more computer-calculated numerical measures of selected properties of the image which can assist the dentist in interpretation." at column 13, line 38).

Elbaum does not specifically disclose/teach a plurality of illuminating light sources with different characteristics of spectroscopic distributions or specifically, an image identification calculating unit which calculates grade data to be used to determine a grade of a color of the subject based on the subject spectroscopic images stored in the image memory unit. However,

Gill teaches a plurality of illuminating light sources with different characteristics of spectroscopic distributions (Refer to page 6, lines 1-8)

Gill also teaches wherein the image processing unit further comprises an image identification calculating unit ("...means for analyzing color values of the image; and means for converting the color values into parameters from which the original color of the object can be reconstituted." at page 4, line 16+ ) which calculates grade data to be used to determine a grade of a color of the subject based on the subject spectroscopic images stored in the image memory unit (For

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example, "the system includes a reference color indicator places in close proximity to the object or associated with the camera's visual field so that the captured image contains a reference color." at page 6, line 15+). Also, "The analysis proceeds to determine both the average and the most dominant color value in each area. The color values are represented by the intensity of red, green and blue components of that value." at page 7, line 16+).

Gill and Elbaum are combinable because they are in the same field of image processing applications specifically for identifying color parameters such as teeth. (See abstract of Gill invention.)

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a plurality of illuminating light sources with different characteristics of spectroscopic distributions and further utilize an image identification calculating unit which calculates grade data to be used to determine a grade of a color of the subject based on the subject spectroscopic images stored in the image memory unit.

The suggestion/motivation for doing so would have been to "accurately select the correct tooth color so as to match, not only the adjacent tooth in color and shape, but to match the entire set of teeth in overall color harmony and surface contour profile." (See page 1, line 24, Gill).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the disclosure of Elbaum with the teachings of Gill to obtain the specified claimed elements of Claim

1.

**Regarding Claims 2-16: (Canceled)**

**Regarding Claim 17:** (New) Gill teaches the grade data indicates a grade of a shading guide for comparing the color of a tooth as the subject (For example, "An image (7) of the prosthesis/crown (6) is then subjected to quality control by comparing its color to that of the original natural tooth (8). In the instance that there is a discrepancy in the match of color between the new crown and the original tooth (9) the dental technician can amend the recipe (5) to compensate for the color difference or alternatively request a further original photograph to work from. In this way, the color of the crown can advantageously be checked before it is released to the dentist for fitting into a patient's mouth." at page 17, lines 10+. Another example, is provided at page 17, lines 23+).

**Regarding Claim 18:** (New) Gill teaches calculates a ceramic compounding ratio of a false tooth based on the grade data to obtain false tooth ceramic compounding ratio data (Refer to page 14, lines 1-11; similarly, refer to page 17, line 23-page 18, line 1-9).

**Regarding Claim 19:** (New) Gill teaches a computer connected to the image processing unit through a network, wherein the image processing unit transfers the grade data and the false tooth ceramic compounding ratio data to the computer (Refer to page 7, lines 10-13).

**Regarding Claim 20:** (New) Gill teaches a ceramic compounding ratio calculation database connected to the computer, wherein the computer searches for a ceramic compounding ratio from the ceramic compounding ratio calculation database based on the grade data and the false tooth ceramic compounding ratio data (Refer to page 8, line 19-page 9, line 5).

**Regarding Claim 21:** (New) Gill teaches a monitor connected to the image processing unit, wherein the image identification calculating unit calculates the grade data before and after treatment of the subject, and the grade data is displayed on the monitor (Refer to page 6, line 15-18, lines 30-page 7, line 2).

**Regarding Claim 22:** (New) Gill teaches an abutting portion formed in a cylindrical shape which abuts the subject (Refer to page 5, lines 17-29).

**Regarding Claim 23:** (New) Gill teaches the abutting portion is configured to be detachably attached to the image capturing unit (Refer to page 5, line 21-29; specifically, "this arrangement is of particular advantage when taking images of a patient's teeth that are not in central position in the mouth. In use, the tube is extended prior to taking of the image and may be retracted when not in use."). For clarity, the Examiner is stating that Gill teaches that this tube can be retracted and manipulated so that it can be detached from the overall system to move and operate accordingly with the operand's directives.

**Regarding Claim 25:** (New) Elbaum teaches optical member which reduces the illuminating unhomogeneity between the illuminating light source and the subject (Refer to Figure 1, numeral 14; "The system 10 includes a source of illumination 11 which provides light to a handpiece 12 via an optical fiber or optical fiber bundle 14." at column 5, line 57).

**Regarding Claim 26:** (New) Elbaum teaches the plurality of illuminating light sources include at least one of: (i) a light source with a center wavelength of 780 to 900 nm, and (ii) a light source



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with a center wavelength of 300 to 380 nm ("The filters may be provided on a filter wheel (not shown), for example. Four wavelength bands are preferred, centered at 500 nm, 600 nm, 700 nm and white light." at column 6, line 45).

**Regarding Claim 27:** (New) Elbaum teaches the image capturing unit and the image processing unit are integrally formed. (Refer to Figure 1, numerals 10).

**Regarding Claim 28:** (New) Elbaum teaches the image capturing unit includes a color chip for calibration in the image processing unit ("The imaging camera 514 was a Toshiba 1/2"570x high-resolution CCD (720x570 pixels), equipped with a 23-mm Schneider function/1.4 Xenoplan lens and an extender for reducing the field-of-view (FOV). The aperture and focus were adjustable. The image calibration scale was 43 pixels/mm over a 11.5-mm FOV." at column 7, line 7).

**Regarding Claim 30:** (New) Elbaum teaches the image processing unit comprises image filing software, and image data photographed upon operating the photographing operating unit is recorded to a predetermined portion of the image filing software (Refer to Figure 14; For example, "Overall image brightness may also be adjusted by the operator based on his observation of the image on the monitor. The operator can override the intensity set by the software, if desired." at column 12, line 5. Another example, "The image is analyzed by the computer software at step 102 to determine whether the maximum image intensity is within a predetermined range." at column 11, line 49).

**Regarding Claim 31:** (New) Elbaum discloses subject portion sensing means which obtains

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positional information of the subject (“...the preferred embodiment of the present invention permits the operator to display on the monitor 28 one or more computer-calculated numerical measures of selected properties of the image which can assist the dentist in interpretation.” at column 13, line 39).

**Regarding Claim 32:** (New) Elbaum teaches distance measuring means which manages the size of the subject in the photographed image (“...the preferred embodiment of the present invention permits the operator to display on the monitor 28 one or more computer-calculated numerical measures of selected properties of the image which can assist the dentist in interpretation.” at column 13, line 39).

**Regarding Claim 33:** (New) Gill teaches the image capturing unit controls the monitor to display a difference between a photographing distance measured by the distance measuring means and a target photographing distance (Refer to page 16, lines 16-page 17, line 8).

**Regarding Claim 34:** (New) Gill teaches a monitor which displays the image of the subject, and wherein the image capturing unit controls the monitor to display an indication that the photographing distance measured by the distance measuring means matches a target photographing distance (Refer to page 17, lines 5-16).

**Regarding Claim 35:** (New) Elbaum discloses a monitor which displays the image of the subject, and wherein the image capturing unit obtains information of a desired photographing distance from images previously picked up, calculates a magnification correcting coefficient based on information of an actual photographing distance measured by the distance measuring

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means and the desired photographing distance information, and controls the monitor to display the image of the subject with a magnification corrected based on the magnification correcting coefficient ("The digital image processing conducted at step 120 provides visually enhanced representations of variations in the image that help the dentist diagnose the condition of the tooth. Preferably, several options are available. For example, digital zooms into and out of the ROI, wavelet amplitude and phase-representations, iso-intensity contours and line scan profiles, may be provided and selected. Digital zooms into the ROI magnify the image. Digital zooms out of the ROI enable the operator to view the area surrounding the ROI, as well as enabling selection of a different ROI. Iso-intensity contours may assist in identifying local gradients which are characteristic of caries." at column 13, line 8).

6. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elbaum (US 6,201,880 B1) and Gill et al. (WO 02/012847 A1), and further in view of Vari (US 5,503,559).

**Regarding Claim 24: (New)**

Elbaum and Gill teach all the claimed elements as listed above.

Elbaum in combination with Gill does not specifically disclose reflected light rejecting means, which prevents the illuminating light source from being photographed to the subject. However, Vari teaches reflected light rejecting means, which prevents the illuminating light source from being photographed to the subject (Refer to Figure 14, numeral 66. "The dichroic filter rejects any excitation that may be included in the return light. The stop has a slit for allowing only a

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narrow ribbon of light to reach the grating. The grating separates the return light along an axis at a distance proportional to the wavelength of the return light." at column 3, line 20).

Elbaum, Gill and Vari are combinable because they are in the same field of image processing, specifically with respect to dentistry.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a reflected light rejecting means as taught by Vari because "the excitation light induces the tissue within the root canal to fluoresce. The fluorescent light is collected by the optical fiber and transmitted back to a sensor that generates electrical signals indicative of the intensity of light within a predetermined wavelength band." (Vari, abstract). The combination of these elements can provide an instant detection of a tooth with the absence of light for stronger detection purposes.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Elbaum, Gill and Vari to obtain the specified claimed elements of Claim 24.

7. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elbaum (US 6,201,880 B1) and Gill et al. (WO 02/012847 A1), and further in view of Irwin (US 7,144,248 B2).

**Regarding Claim 29: (New)**

Elbaum and Gill teach all the claimed elements as listed above.

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Elbaum in combination with Gill does not specifically disclose a portable terminal device having a photographing function and an illuminating light source unit having a plurality of illuminating light sources as one unit having different characteristics of spectroscopic distributions [that] is attachable to the portable terminal device having the photographing function.

Irwin teaches the image capturing unit uses a portable terminal device having a photographing function (Refer to Figure 3, numeral 1010), and an illuminating light source unit having a plurality of illuminating light sources as one unit having different characteristics of spectroscopic distributions (Refer to Figure 3, numeral 1012) is attachable to the portable terminal device having the photographing function (Refer to Figure 3, numeral 1026).

Elbaum, Gill and Irwin are combinable because they are in the same field of image processing, specifically with respect to dentistry.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use a portable terminal device having a photographing function with an illuminating light source unit that is attachable to the portable terminal device as taught by Irwin because the portable device can also be attached to other types of machinery (For example, "The chilled substrate 2210, for example, may be used in connection with a laser-based system 1010 such as depicted in FIG. 3 that contains a laser 1020, possible computer controlled, that is optically coupled to a hand piece 1030 via a flexible guide 1024." at column 23, line 37).

Therefore, it would have been obvious to the skilled artisan to combine the teachings of Elbaum, Gill and Irwin to obtain the specified claimed elements of Claim 29.

***Response to Arguments***

8. Applicant's arguments with respect to claims 1, 17-35 as discussed at page 16-20 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*/Mia M Thomas/*  
Examiner, Art Unit 2624

/Vikkram Bali/

Supervisory Patent Examiner, Art Unit 2624